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ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/511,470	BOBIER, JOSEPH A.	
	Examiner	Art Unit	
	Chieh M Fan	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 February 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-61* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *49,50 and 54* is/are allowed.

6)☒ Claim(s) *1-3,5-9,19-32,35-38,41-44,47,48,55-61* is/are rejected.

7)☒ Claim(s) *4,10-18,33,34,39,40,45,46 and 51-53* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 February 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claims 1-30, 51-53 and 55-57 are objected to because of the following informalities:

Regarding claim 1, "The method for transmitting" in line 1 should be changed to --- A method for transmitting ---.

Regarding claim 6, there are two step (e)'s in the claim (one in claim 1 and one in claim 6).

Regarding claim 9, "n said RF carriers" in lines 2-3 should be changed to --- n RF carriers – since claim 1, on which claim 9 depends, never recites RF carriers.

Regarding claim 10, there are two step (e)'s in the claim (one in claim 1 and one in claim 10).

Regarding claim 12, it appears "integer ration" in line 2 should be changed to --- integer ratio ---.

Regarding claim 17, "n said RF carriers" in lines 2-3 should be changed to --- n RF carriers – since claim 1, on which claim 9 depends, never recites RF carriers; "n said information streams" in line 4 should be changed to --- n information streams ---; "n said modulated carrier" in line 7 should be changed to --- n modulated carriers ---.

Regarding claim 19, there are two step (e)'s in the claim (one in claim 1 and one in claim 19).

Regarding claim 23, it appears that "said step (d)" in line 7 should be changed to --- said step (e) ---.

Regarding claim 26, "The method for transmitting" in line 1 should be changed to --- A method for transmitting ---.

Regarding claim 51, it appears "integer ration" in line 2 should be changed to --- integer ratio ---.

Regarding claim 55, "The method for transmitting" in line 1 should be changed to --- A method for transmitting ---.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 26-30 and 55 are rejected under 35 U.S.C. 102(b) as being anticipated by Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter).

Regarding claim 1, Hiramatsu discloses a method for transmitting binary information from an information stream, comprising the steps of:

(a) generating an R.F. carrier at a select carrier frequency and exhibiting a waveform with a continuous sequence of wavelets each being defined between crossover positions each of which represents a substantially zero energy level (14 in Fig. 3);

(b) receiving said information stream as a given sequence of first and second binary signals (11 in Fig. 3);

(c) synchronizing said sequence of first and second binary signals with said carrier continuous sequence of wavelet crossover positions to provide synchronizing control outputs corresponding with said first and second binary signals (as shown in Figs. 8(A) and 8(B), the edge of the binary data is synchronized with the crossover positions of the carrier signal, therefore, there are implicitly synchronizing control outputs),

(d) modulating said carrier in response to said synchronizing control outputs by terminating said carrier between wavelet defining crossover positions to derive a said first binary signal and transmitting a said wavelet between said crossover positions within said sequence to derive a said second binary signal (12, 13 in Fig. 3, also see the output of 13 in Fig. 8(B), that is, the carrier is modulated by a on-off keying signal; also see col. 3, lines 60-65); and

(e) broadcasting said modulated carrier (19 in Fig. 3).

Regarding claim 2, said step (d) for modulating said carrier is carried out by switching said carrier off and on in response to said synchronizing control outputs

without effecting a sideband generating distortion thereof (as shown in Fog. 8(B), the carrier is turned on and off according to the binary data).

Regarding claim 26, Hiramatsu discloses a method for transmitting binary information from an information stream, comprising the steps of:

(a) generating a sinusoid defining R.F. carrier (14 in Fig. 3A);

(b) receiving said information stream as a sequence of binary signals (11 in Fig. 3A);

(c) modulating said carrier in correspondence with said sequence of binary signals by terminating portions of said carrier without substantially affecting frequency expanding distortion of said sinusoidal carrier (12, 13 in Fig. 3A; also see Fig. 8B for the output of 13, that is, the carrier is modulated by a on-off keying signal; also see col. 3, lines 60-65); and

(d) broadcasting said modulated carrier (19 in Fig. 3A).

Regarding claim 27, wherein said step (c) is carried out by effecting said terminating of portions of said carrier by terminating at least one full cycle of said sinusoid (as shown in Fig. 8(B), at least one full cycle of the sinusoid is terminated).

Regarding claim 28, wherein said step (c) is carried out by selectively switching said carrier on and off for at least one full cycle of said sinusoid at the crossover locations thereof defining a cycle (as shown in Fig. 8B, the sinusoid is turned on or off at the crossover locations).

Regarding claim 29, wherein said step (c) for modulating said carrier is carried out by synthesizing said carrier as a sequence of full cycle wavelets, the presence and

absence of which corresponds with first and second binary components of said binary information (as shown in Figs. 8A and 8B, the carrier is present when the binary data is one and the carrier is present when the binary data is zero).

Regarding claim 30, wherein each said full cycle wavelet is substantially a sinusoid which extends between a zero cross-over location at the commencement of a positive-going half-cycle and terminates at a zero cross-over location terminating a negative half-cycle (as shown in Fig. 8(B), the carrier is turned on at the positive-going zero cross-over location and is turned off at the a zero-cross location terminating a negative half-cycle).

Regarding claim 55, Hiramatsu teaches a method of transmitting binary information from an information stream comprising the steps of:

(a) generating an R.F. carrier at a select carrier frequency and exhibiting a waveform with a continuous sequence of wavelets each being defined between crossover positions representing substantially a zero energy level (14 in Fig. 3A);

(b) receiving said information stream as a given sequence of first and second binary signals (11 in Fig. 3A),

(c) responding to said first binary signal and to said R.F. carrier to synthesize a said wavelet at said select carrier frequency as an output condition signal and responding to said second binary signal to provide the absence of a said wavelet as a said output condition signal (12, 13 in Fig. 3, also see the output of 13 in Fig. 8(B), that is, the carrier is modulated by a on-off keying signal; also see col. 3, lines 60-65); and

(d) broadcasting said output condition signals at said select carrier frequency (19 in Fig. 3A).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3, 31, 32, 38, 42, 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Billings et al. (U.S. Patent No. 4,245,184, "Billings" hereinafter).

Regarding claim 3, Hiramatsu teaches the claimed invention (see the rationale applied to claim 1 above), but does not particularly mention that the step of synchronizing said binary signals with said carrier sequence wavelet crossover positions includes a step of phase tracking said carrier to provide a phase signal identifying said crossover positions. Billings teaches that a means for zero crossover synchronization both upon on and off conditions (lines 9-11 in the abstract) would require a zero crossover circuit (40 in Fig. 1; col. 3, lines 40-41). The zero crossover circuit produces a signal indicative of zero crossover positions (lines 10-14 of claim 1). It

is clear that, in order to synchronize the edge of the binary signals with the zero crossover positions of the carriers as shown in Figs. 8(A) and 8(B) of Hiramatsu, the zero crossover positions need to be detected. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that a zero crossover circuit is explicitly required to indicate the zero crossover positions of the carriers and thereby to permit synchronization of the binary signals with the zero crossover positions of the carrier.

Regarding claim 31, Hiramatsu discloses a system for transmitting binary information from a digital information stream, comprising:

a transmission assembly including:

a local oscillator generating an R.F. carrier at a select carrier frequency exhibiting a waveform with a continuous sequence of wavelets each exhibiting a period defined between zero crossover positions (14 in Fig. 3A);

a synchronizer assembly responsive to said information stream and deriving synchronizing control outputs corresponding with first and second binary signals representing said binary information (12 in Fig. 3A; as shown in Figs. 8(A) and 8(B), the edge of the binary data is synchronized with the crossover positions of the carrier signal, therefore, there are implicitly synchronizing control outputs from 12);

a modulator assembly responsive to said R.F. carrier and to said synchronizing control outputs for deriving a transmission output by switching said R.F. carrier off at a said crossover position for the said period of one or more said wavelets to define said first binary signal and for transmitting said carrier for the said period of one or more said

wavelets to define said second binary signal (13 in Fig. 3A; also see Fig. 8B for the output of 13, that is, the carrier is modulated by a on-off keying signal; also see col. 3, lines 60-65); and

an R. F. transmission assembly including an antenna and responsive to said transmission output for effecting the broadcast thereof at said select carrier frequency as a broadcasted transmission output (18, 19 in Fig. 3A); and

a receiving assembly including:

a receiving antenna assembly responsive to said broadcasted transmission output to derive an antenna output corresponding therewith (21 in Fig. 3B),

a filter assembly responsive to said antenna output for deriving a received modulated carrier signal (25 in Fig. 3B); and

a demodulator assembly responsive to said received modulated carrier signal to detect the respective absence and presence of said wavelets to derive received binary information corresponding with said binary information from said digital information stream (26, 27 in Fig. 3B).

Hiramatsu does not particularly mention a phase tracking assembly responsive to said carrier and having a crossover output at said crossover positions defining a said wavelet. Billings teaches that a means for zero crossover synchronization both upon on and off conditions (lines 9-11 in the abstract) would require a zero crossover circuit (40 in Fig. 1; col. 3, lines 40-41). The zero crossover circuit produces a signal indicative of zero crossover positions (lines 10-14 of claim 1).

It is clear that, in order to synchronize the edge of the binary signals with the zero crossover positions of the carriers as shown in Figs. 8(A) and 8(B) of Hiramatsu, the zero crossover positions need to be detected. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that a zero crossover circuit is explicitly required to indicate the zero crossover positions of the carriers and thereby to permit synchronization of the binary signals with the zero crossover positions of the carrier.

Regarding claim 32, as shown in Fig. 8(B) of Hiramatsu, each wavelet represents a sinusoid of N×360° (N is an integer). The value of N is only a matter of design option dictated by system requirement. The value of N only depends on the frequency of the output signal from the oscillator 14. Such frequency would not change the operation procedure of Hiramatsu. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to change the value of N to any proper value, such as one, to meet the system requirement.

Regarding claim 38, the filter assembly of Hiramatsu is a band-pass filter (25 in Fig. 3B).

Regarding claim 42, Hiramatsu also teaches a squaring amplifier (26 in Fig. 3B, note that the outputs of 26 are square waves).

Regarding claim 43, Hiramatsu discloses an apparatus for transmitting binary information from an information stream, comprising:

a local oscillator generating an R.F. carrier at a select carrier frequency, exhibiting a waveform with a continuous sequence of wavelets each extending between

zero crossover positions defining wavelet periods and exhibiting substantially zero electromagnetic wave energy (14 in Fig. 3A);

a synchronizer assembly responsive to said information stream and deriving synchronizing control outputs corresponding with first and second binary signals representing said binary information (12 in Fig. 3A; as shown in Figs. 8(A) and 8(B), the edge of the binary data is synchronized with the crossover positions of the carrier signal, therefore, there are implicitly synchronizing control outputs from 12);

a modulator assembly responsive to said R.F. carrier and to said synchronizing control outputs and deriving a transmission output by switching said R.F. carrier off at a said crossover position to define said first binary signal and for transmitting said carrier for at least the said period of a wavelet commencing and ending with said crossover position to define said second binary signal (13 in Fig. 3A; also see Fig. 8B for the output of 13, that is, the carrier is modulated by a on-off keying signal; also see col. 3, lines 60-65); and

an R.F. transmission assembly, including an antenna responsive to said transmission output for effecting the broadcast thereof (18, 19 in Fig. 3A).

Hiramatsu does not particularly mention a phase tracking assembly responsive to said carrier and having a crossover output at said crossover positions defining a said wavelet. Billings teaches that a means for zero crossover synchronization both upon on and off conditions (lines 9-11 in the abstract) would require a zero crossover circuit (40 in Fig. 1; col. 3, lines 40-41). The zero crossover circuit produces a signal indicative of zero crossover positions (lines 10-14 of claim 1).

It is clear that, in order to synchronize the edge of the binary signals with the zero crossover positions of the carriers as shown in Figs. 8(A) and 8(B) of Hiramatsu, the zero crossover positions need to be detected. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that a zero crossover circuit is explicitly required to indicate the zero crossover positions of the carriers and thereby to permit synchronization of the binary signals with the zero crossover positions of the carrier.

Regarding claim 34, as shown in Fig. 8(B) of Hiramatsu, each wavelet represents a sinusoid of N×360° (N is an integer). The value of N is only a matter of design option dictated by system requirement. The value of N only depends on the frequency of the output signal from the oscillator 14. Such frequency would not change the operation procedure of Hiramatsu. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to change the value of N to any proper value, such as one, to meet the system requirement.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Najarian (U.S. Patent No. 6,151,278).

Hiramatsu teaches the claimed invention (see the rationale applied to claim 1 above), but does not teach the step of filtering the harmonics from the modulated carrier. Najarian teaches the step of filtering to suppress output harmonics of in an on-off keying (OOK) modulation transmitter. Therefore, it would have been obvious to a

person of ordinary skill in the art at the time the invention was made to incorporate the step of filtering to remove output harmonics in the OOK transmitter of Hiramatsu, so as to improve the output signal quality.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Tsutsumi (JP 59-10060).

Hiramatsu teaches the claimed invention (see the rationale applied to claim 1 above), but does not teach transmitting plural bits simultaneously using plural RF carriers each having a unique carrier frequency, wherein each bit of the plural bits is assigned with a unique carrier. Tsutsumi teaches transmitting plural bits (①-⑧ in Fig. 1) simultaneously using plural carrier signals. Each bit is represented by a unique carrier (12 in Fig. 1). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to transmit plural bits simultaneously, as taught by Tsutsumi, so as to increase the data rate.

8. Claims 6, 7, 19, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Bien (U.S. Patent No. 5,105,165) and Green, Jr. (U.S. Patent No. 5,266,506).

Regarding claims 6, 7, 19 and 20, Hiramatsu teaches the claimed invention (see the rationale applied to claim 1 above) including the steps of providing a receiver

assembly having an antenna exhibiting a broadband reception characteristic (21 in Fig. 3B), submitting the received signal to a narrow band filtering stage to provide a filtered output (25 in Fig. 3B), deriving a binary information stream from the filtered output (26, 27 in Fig. 3B), and providing said binary information stream at a receiver output (output of 27 in Fig. 3B), but does not teach the step of amplifying the antenna output to provide a received signal without effecting distortion of said antenna output. Bien teaches that, to increase the sensitivity of a receiver, a preamplifier is coupled to an antenna. The preamplifier serves to boost weak input signals to overcome the internal noise of the receiver, allowing the receiver to receive weaker signals (col. 1, lines 28-33). Green, Jr. teaches that a preamplifier is usually a Class-A amplifier, typically, the most distortion-free of all amplifier classes (col. 1, lines 61-63). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to couple a Class-A preamplifier to the antenna of Hiramatsu, so as to increase the sensitivity of the receiver without introducing distortion.

Regarding claim 22, Hiramatsu also teaches a squaring amplifier (26 in Fig. 3B, note that the outputs of 26 are square waves).

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Bien (U.S. Patent No. 5,105,165) and Green, Jr. (U.S. Patent No. 5,266,506) as applied to claim 19 above, and further in view of Ella (U.S. Patent No. 6,081,171).

As explained above, Hiramatsu in view of Bien and Green, Jr. teaches the claimed invention, but does not specifically teaches that the step of submitting the

received signal to a narrow band filtering stage is carried out with a crystal implemented RF filter. Ella teaches that the advantage of employing crystal implemented passband filters is the better stopband attenuation characteristics provided by these filters (col. 10, lines 43-50). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a crystal implemented bandpass filter of the system of Hiramatsu in view of Bien and Green, Jr., for the advantage of better stopband attenuation.

10. Claims 23, 58 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Cronyn (U.S. Patent No. 5,223,840).

Regarding claim 23, Hiramatsu teaches the claimed invention (see the rationale applied to claim 1 above) including a gate circuit (13 in Fig. 3A) responding to the first binary signal and the RF carrier to generate a wavelet at said select carrier frequency and responding to the second binary signal to provide the absence of the wavelet, but does not specifically indicate that the gate circuit is a synthesizer. Cronyn teaches the advantage of using a direct digital synthesizer as a signal generator is that returning is fast and higher resolution (col. 7, lines 24-27). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a direct digital synthesizer in place of the gate circuit of Hiramatsu because of the advantage of faster generation and higher resolution.

Regarding claim 58, Hiramatsu teaches an apparatus for transmitting binary information from an information stream (11 in Fig. 3A), comprising:

a local oscillator generating an R.F. carrier at a select carrier frequency, exhibiting a waveform with a continuous sequence of wavelets each extending between zero crossover positions defining wavelet periods and exhibiting substantially zero electromagnetic wave energy (14 in Fig. 3A),

a gate circuit responsive to said R.F. carrier and to a control input to derive a synthesized output including a wavelet signal at said select carrier frequency representing a first binary valve and the absence of a said synthesized wavelet signal representing a second binary valve (13 in Fig. 3A; also see Fig. 8B for the output of 13, that is, the carrier is modulated by a on-off keying signal; also see col. 3, lines 60-65);

a controller, responsive to said information stream to derive said control inputs effecting synthesis of said gate circuit output in correspondence with said binary information (12 in Fig. 3A); and

an R.F. transmission assembly, including an antenna responsive to said synthesizer output to effect the broadcasting thereof (18, 19 in Fig. 3A).

Hiramatsu does not particularly indicate that the gate circuit is a synthesizer. Cronyn teaches the advantage of using a direct digital synthesizer as a signal generator is that returning is fast and higher resolution (col. 7, lines 24-27). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a direct digital synthesizer in place of the gate circuit of Hiramatsu because of the advantage of faster generation and higher resolution.

Regarding claim 59, as shown in Fig. 8(B) of Hiramatsu, each wavelet represents a sinusoid of N×360° (N is an integer). The value of N is only a matter of design option dictated by system requirement. The value of N only depends on the frequency of the output signal from the oscillator 14. Such frequency would not change the operation procedure of Hiramatsu. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to change the value of N to any proper value, such as one, to meet the system requirement.

11. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Cronyn (U.S. Patent No. 5,223,840) as applied to claim 23 above, and further in view of Najarian (U.S. Patent No. 6,151,278).

Regarding claim 24, Hiramatsu in view of Cronyn teaches the claimed invention (see the rationale applied to claim 23 above), but does not teach the step of filtering the synthesized modulated carrier to enhance the integrity thereof. Najarian teaches the step of filtering to suppress output harmonics of in an on-off keying (OOK) modulation transmitter (col. 6, lines 57-63). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the step of filtering to remove output harmonics of the synthesized modulated carrier of Hiramatsu in view of Cronyn, so as to improve the output signal quality.

Regarding claim 25, as explained above in the rationale applied to claim 23, Cronyn teaches a direct digital synthesizer.

12. Claims 35 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Green, Jr. (U.S. Patent No. 5,266,506).

Regarding claim 35, Hiramatsu teaches the claimed invention (see the rationale applied to claim 31 above) including a transmission amplifier (18 in Fig. 3A) coupled to the antenna, but does not specify that the transmission amplifier is a Class-A amplifier. Green, Jr. teaches that the Class-A amplifier is the most distortion-free amplifier of all amplifier classes (col. 1, lines 61-63). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a Class-A amplifier to as the transmission amplifier, so as to increase the gain of the transmitting signals without introducing distortion.

Regarding claim 47, Hiramatsu teaches the claimed invention (see the rationale applied to claim 43 above) including a transmission amplifier (18 in Fig. 3A) coupled to the antenna, but does not specify that the transmission amplifier is a Class-A amplifier. Green, Jr. teaches that the Class-A amplifier is the most distortion-free amplifier of all amplifier classes (col. 1, lines 61-63). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a Class-A amplifier to as the transmission amplifier, so as to increase the gain of the transmitting signals without introducing distortion.

13. Claims 36 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Najarian (U.S. Patent No. 6,151,278).

Regarding claim 36, Hiramatsu teaches the claimed invention (see the rationale applied to claim 31 above), but does not teach the step of filtering the modulated carrier to enhance the integrity thereof. Najarian teaches the step of filtering to suppress output harmonics of in an on-off keying (OOK) modulation transmitter (col. 6, lines 57-63). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the step of filtering to remove output harmonics of the modulated carrier of Hiramatsu, so as to improve the output signal quality.

Regarding claim 48, Hiramatsu teaches the claimed invention (see the rationale applied to claim 43 above), but does not teach the step of filtering the modulated carrier to enhance the integrity thereof. Najarian teaches the step of filtering to suppress output harmonics of in an on-off keying (OOK) modulation transmitter (col. 6, lines 57-63). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the step of filtering to remove output harmonics of the modulated carrier of Hiramatsu, so as to improve the output signal quality.

14. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Billings

et al. (U.S. Patent No. 4,245,184, "Billings" hereinafter) as applied to claim 31 above, and further in view of Bien (U.S. Patent No. 5,105,165) and Green, Jr. (U.S. Patent No. 5,266,506).

Hiramatsu in view of Billings teaches the claimed invention (see the rationale applied to claim 31 above), but does not teach the step of pre-amplifying the antenna output to provide a received signal using a Class-A amplifier. Bien teaches that, to increase the sensitivity of a receiver, a preamplifier is coupled to an antenna. The preamplifier serves to boost weak input signals to overcome the internal noise of the receiver, allowing the receiver to receive weaker signals (col. 1, lines 28-33). Green, Jr. teaches that a preamplifier is usually a Class-A amplifier, typically, the most distortion-free of all amplifier classes (col. 1, lines 61-63). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to couple a Class-A preamplifier to the antenna of Hiramatsu/Billings, so as to increase the sensitivity of the receiver without introducing distortion.

15. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Billings et al. (U.S. Patent No. 4,245,184, "Billings" hereinafter) as applied to claim 31 above, and further in view of Ella (U.S. Patent No. 6,081,171).

As explained above with respect to claim 31, Hiramatsu in view of Billings teaches the claimed invention including the filter assembly is a band-pass filter (25 in Fig. 3B), but does not specifically teaches that the band-pass filter comprises a crystal

implemented RF filter. Ella teaches that the advantage of employing crystal implemented passband filters is the better stopband attenuation characteristics provided by these filters (col. 10, lines 43-50). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a crystal implemented bandpass filter of the system of Hiramatsu in view of Bien and Green, Jr., for the advantage of better stopband attenuation.

16. Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Najarian (U.S. Patent No. 6,151,278).

Hiramatsu teaches the claimed invention (see the rationale applied to claim 55 above), but does not teach the step of filtering the modulated carrier to enhance the integrity thereof. Najarian teaches the step of filtering to suppress output harmonics of in an on-off keying (OOK) modulation transmitter (col. 6, lines 57-63). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the step of filtering to remove output harmonics of the modulated carrier of Hiramatsu, so as to improve the output signal quality.

17. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Najarian (U.S. Patent No. 6,151,278) as applied to claim 56 above, and further in view of Cronyn (U.S. Patent No. 5,223,840).

Hiramatsu in view of Najarian teaches the claimed invention (see the rationale applied to claim 56 above) including a gate circuit (13 in Fig. 3A) responding to the first binary signal and the RF carrier to generate a wavelet at said select carrier frequency and responding to the second binary signal to provide the absence of the wavelet, but does not specifically indicate that the gate circuit is a controllable frequency synthesizer. Cronyn teaches the advantage of using a direct digital synthesizer as a signal generator is that returning is fast and higher resolution (col. 7, lines 24-27). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a direct digital synthesizer in place of the gate circuit of Hiramatsu/Najarian because of the advantage of faster generation and higher resolution.

18. Claim 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Cronyn (U.S. Patent No. 5,223,840) as applied to claim 58 above, and further in view of Green, Jr. (U.S. Patent No. 5,266,506).

Hiramatsu in view of Cronyn teaches the claimed invention (see the rationale applied to claim 58 above) including a transmission amplifier (18 in Fig. 3A) coupled to the antenna, but does not specify that the transmission amplifier is a Class-A amplifier. Green, Jr. teaches that the Class-A amplifier is the most distortion-free amplifier of all amplifier classes (col. 1, lines 61-63). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a Class-A amplifier

to as the transmission amplifier, so as to increase the gain of the transmitting signals without introducing distortion.

19. Claim 61 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (U.S. Patent No. 5,136,614, "Hiramatsu" hereinafter) in view of Cronyn (U.S. Patent No. 5,223,840) as applied to claim 58 above, and further in view of Najarian (U.S. Patent No. 6,151,278).

Hiramatsu in view of Cronyn teaches the claimed invention (see the rationale applied to claim 58 above), but does not teach the step of filtering the synthesized modulated carrier to enhance the integrity thereof. Najarian teaches the step of filtering to suppress output harmonics of in an on-off keying (OOK) modulation transmitter (col. 6, lines 57-63). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the step of filtering to remove output harmonics of the synthesized modulated carrier of Hiramatsu in view of Cronyn, so as to improve the output signal quality.

Allowable Subject Matter

20. Claims 4, 10-18, 33, 34, 39, 40, 45 and 46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 10-

18 also need be rewritten to overcome the claim objections stated in Paragraph 1 of this Office Action.

Claims 49, 50 and 54 are allowed. Claims 51-53 would be allowable is rewritten to overcome the claim objections stated in Paragraph 1 of this Office Action.

21. The following is a statement of reasons for the indication of allowable subject matter:

Claim 4 is allowable over the prior art of record because the prior art of record does not teach or suggest the step (c) effects said combining of said phase signal with said sequence of first and second binary signals with select delays for permitting said carrier modulation termination and transmission to persist for the interval of at least a full cycle wavelets.

Claims 10-14 are allowable over the prior art of record because the prior art of record does not teach or suggest the steps of providing a receiver local oscillator having a select mixing frequency output and mixing said mixing frequency output with said received modulated carrier signal to derive a mixed output exhibiting intermediate frequency components.

Claims 15-18 are allowable over the prior art of record because the prior art of record does not teach or suggest the steps of providing a receiver local oscillator having a select mixing frequency output and mixing said mixing frequency output with said received modulated carrier signal to derive a mixed output exhibiting unique

intermediate frequency components corresponding with the frequencies of said n R.F. carriers.

Claims 33 and 34 are allowable over the prior art of record because the prior art of record does not teach or suggest that the synchronizer assembly includes an ANDing assembly having said synchronizing control outputs upon the synchronized occurrence of said first and second binary signals with a said crossover output.

Claims 39, 45 and 46 are allowable over the prior art of record because the prior art of record does not teach or suggest a second class A amplifier stage responsive to said amplified received modulated carrier signal for deriving said received binary information in rectangular wave from.

Claim 40 is allowable over the prior art of record because the prior art of record does not teach or suggest a digital signal processor responsive to said reference output and to said amplified received modulated carrier signal to effect a comparison therebetween and propagate said first binary signal in absence of a said wavelet and said second binary signal in the presence of a wavelet at said amplified received modulated carrier signal.

Claims 49-54 are allowable over the prior art of record because the prior art of record does not teach or suggest a receiver local oscillator having a select mixing frequency output and a mixer assembly responsive to said select mixing frequency output and to said antenna output to derive a mixing output exhibiting intermediate frequency components.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chieh M Fan whose telephone number is (703) 305-0198. The examiner can normally be reached on Monday-Friday 8:00AM-5:30PM, Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (703) 305-4714. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

Chieh M Fan
Examiner
Art Unit 2634

cmf
October 30, 2003